

local on the western side of the continent, or it would have been met with before. When this remarkable plant was known to occur only in Eastern North America and Eastern Australia, it made the strongest case in favor of double creation that perhaps has ever been adduced. But since it has been found to occur throughout the Eastern Himalayas and in Japan, and has now been detected in Northwestern America also, the case seems to crown the conclusions to which this memoir arrives.

ART. XXI.—*Supplement to an Enumeration of North American Lichens, continued*; by EDWARD TUCKERMAN, A.M., Professor of Botany in Amherst College.

THE species follow each other, as before, in the order of the arrangement proposed by Dr. Nylander, who has studied these plants in the light afforded by a knowledge which includes not only the external, but all the microscopical details. Some species, not North American as yet known, but of more or less interest in connection with our flora, are added in brackets.

COLLEMA APALACHENSE, Tuck. in litt., thallo stellato multifido imbricato crassiusculo fusco-viridi, laciniis plano-convexis apice subteretibus obtusis rugulosis, subtus pallidis; apotheciis innato-sessilibus planis rufescentibus margine integerrimo. Sporæ ellipsoideæ 3-septatæ diam. vix duplo longiores. Lime-rocks, Hancock county, Alabama, *Hon. T. M. Peters*.

COLLEMA TEXANUM, sp. nova, thallo orbiculari substellato imbricato crasso luteo-virescente, laciniis radiantibus elongatis subplanis profunde pinnato-laceris papulosis; apotheciis sparsis planiusculis rufis margine tumido integro. Sporæ minimæ fusiformes uniseptatæ.—Trees, Texas, *Mr. Charles Wright*. Resembles the more perfect forms of *C. pulposum*. Spores exceedingly small. I am indebted, for their detection and delineation, to my friend, the Rev. J. L. Russell.

LEPTOGIUM CRENATELLUM, sp. nova, thallo imbricato tenerissimo glauco-cinerascente, laciniis rotundatis crenatis denticulatis; apotheciis minusculis creberrimis sessilibus convexis pallido-fuscescentibus margine tenui pallescente subintegro evanescente. Sporæ ellipsoideæ 5-septatæ.—On trees in swamps, Brattleborough, Vermont, *Mr. C. C. Frost*.

LEPTOGIUM JUNIPERINUM, Tuck. in litt., thallo pusillo suborbiculari imbricato tenui plumbeo e lobis rotundatis adscendentibus crenatis subtus ad margines albo-fibrillosis; apotheciis sessilibus plano-convexis margine tenui demum evanido discum rufofuscum cingente. Sporæ ellipsoideæ apicibus acutæ 3-septatæ.—On the earth in cedar woods, Texas. *Mr. Wright*.

CALICIUM CURTISII, sp. nova, thallo byssaceo nigro (vel obsoleto) apotheciis minutis turbinatis disco subnitido nigro stipitibus brevibus ex albido rufescentibus demum nigris. Sporæ majusculæ ellipsoideæ vel elongato-ellipsoideæ (dactylinæ, Koerb.) fuscescentes simplices.—On the living bark of *Rhus typhina*, in Berkshire, Massachusetts; and of *Robinia Pseudacacia*, at the Hot Springs, Virginia, *Rev. Dr. Curtis*. The stipes like those of *Calicium* or *Coniocybe nigricans*, Fr. (not of Tuckerm. Synops. Lich. N. E. which is *C. subtile*, on Bark) but the apothecia quite different, and the spores very much larger than in that species; as in *C. eusporum*, Nyl., to which, and *C. byssaceum*, Fr., the lichen is probably nearest.

BÆOMYCES ABSOLUTUS, sp. nova, thallo crustaceo effuso tenuissimo submembranaceo læteviridi; apotheciis stipitatis incarnatis planis disco demum convexiusculo marginem tenuem excludente. Sporæ ellipsoideæ simplices hyalinæ. Biatora icmadophila, var. stipitata, Tuckerm. in litt. ad cel. Montagne.—On the earth, Alabama, *Mr. Peters*. [Mountains of Cuba, *Mr. Wright*. Venezuela, *Mr. Fendler*.] Representing possibly, in tropical America, both *B. ericetorum* (*B. roseus*, Auctt.) and *B. æruginosus* (*Biat. icmadophila*, Auctt.) but nearest to the last, which it seems to connect, naturally, with the first.

[CLADONIA DACTYLOTA, sp. nova, thalli squamulis amplis erectis subtus albo-pulverulentis podetia gracilescentia cylindrica membranaceo-corticata lævigata viridi-pallescentia e margine proferentibus, scyphis angustatis margine subincurvis denticulatis demum oblique prolifero-palmatis; apotheciis carneo-fuscescentibus.

Var. β , *symphycarpia*, podetiis elongatis scyphis subintegris (vel obsoletis) apotheciis conglomeratis.

Var. γ , *sorediata*, podetiis hinc inde, scyphisque, vel his oblitteratis apicibus clavatis cornutisve sorediis pulvinatis albis adsperis.—On the earth in the mountains of Cuba, *Mr. Wright*. Venezuela, *Mr. Fendler*. Differs from *C. fimbriata* as *C. digitata* differs from *C. deformis*. The primary form is hardly distinguishable from *C. digitata*, except in being whiter, and in the color of the apothecia. The white, cushion-like, powdery soredia, which, in what seems to be the commonest state, take the place of the apothecia, and are scattered over the smooth podetia (in the latter case appearing clearly to be deliquescent squamules) make perhaps the most striking, however an abnormal feature of this elegant *Cladonia*.]

STEREOCAULON NANODES, sp. nova, podetiis pumilis erectis cæspitose-conglomeratis subnudis validis tereti-compressis a basi vage apicemque versus fastigiato-ramosis albidis, phyllocladiis ad apices confertis e rotundato-subsquamaceis glaucis demum

pulverulentis; apotheciis terminalibus dilatatis demum convexis. Sporæ generis. *S. nanum*, Tuck. Synops. N. E. p. 46, pr. p.—Rocks near water, (Crystal Falls; Saco Falls; Upper Gorge of the Ammonoosuck) in the White Mountains. *S. nanum* of European authors (Fr. Lich. Suec. n. 59; Schær. Lich. Helv. n. 588; Moug. and Nestl. Crypt. Vog. n. 647) appears to be an atypical condition, and has not yet occurred with us, but I have hitherto taken the present as representing the perfect state of the species. The full development of our lichen seems however to indicate a different affinity, and to separate it from the section (*Chondrocaulon*, Th. Fr.) which includes *S. nanum*. It is perhaps rather nearer to *S. denudatum*.

STEROCAULON CHLORELLUM, sp. nova, podetiis pumilis erectis glabris nitidis subcompressis lacunosis stramineis fastigiato-ramosis, phyllocladiis ad apices confertis minutis rotundatis mox deliquescentibus pulverulentis; apotheciis—Rocks, Islands of Behring's Straits, *Mr. Wright*. At once distinguishable by its minuteness, smoothness, and pale-yellow or straw color. The granules (phyllocladia, Th. Fr.) are exceedingly small. The apothecia are as yet unknown.

STEREOCAULON? WRIGHTII, sp. nova, thallo cæspitose cartilagineo subfoliaceo glaucescente, ramis laciniæformibus adscendentibus extrorsum latioribus inciso-ramosis crenatis margine inflexis crispatis supra viridescentibus subtus nervosis tenuiter tomentosus; cephalodiis majusculis pulvinatis viridi-nigrescentibus plicato-rugosis demum floccosis; apotheciis—Rocks, Islands of Behring's Straits, *Mr. Wright*. With the habit of erect states of *Squamaria chrysoleuca*, but the cephalodia of *Stereocaulon*. It is perhaps not impossible that these little understood developments should occur outside of the present genus, or that this lichen should be *sui generis*. The crisped margins take often the shape of Parmeliaceous apothecia, thus increasing the general resemblance of the plant to a *Squamaria*. But it has also evident points of similarity to *Stereocaulon? pulvinatum*, Ach., an obscure Cape of Good Hope lichen, for specimens of which I am indebted to Dr. Sonder of Hamburg. The apothecia of this last also are unknown.

[*ALECTORIA JAPONICA*, sp. nova, thallo subcæspitose tereti rigido sorediis albis exasperato stramineo, ramis sterilibus ramissimis implexis attenuatis subfilamentosis, fertilibus simpliciusculis incrassatis, apicibus nigricantibus; apotheciis subterminalibus superficiali-sessilibus appendiculatis disco concavo demum expanso plano nitido castaneo. Sporæ majusculæ ellipsoideæ limbatae viridi-fuscescentes demum subhyalinæ.—On dead pine trees, Ayan, Japan, *Mr. Wright*. Nearest to *A. ochroleuca*, but differing very much in habit, and in fructification. The spores are not very unlike those of *Pertusaria pertusa*.]

[*RAMALINA DASYPOGA*, sp. nova, thallo filamentoso rigidiusculo fragili tereti lævigato viridi-fuscescente (pallescente) ramis elongatis dichotome ramosis ultimis acuminatis nodulosis; apotheciis concavis demum planis repandis margine tenui incurvo subcrenulato disparente. Sporæ ellipsoideæ uniseptatæ curvulæ hyalinæ diam. duplo longiores.—On trees and rocks in the mountains of Cuba, *Mr. Wright*. Allied to *R. usneoides* (Ach.) Nyl., which has also been found in Cuba, by the same unwearied collector, but differs in its regularly terete thallus, larger apothecia, &c. It is still more like a pendulous *Usnea*, or perhaps *Alectoria*; but possesses the spores of the present genus.]

CETRARIA CALIFORNICA, sp. nova, thallo cæspitoso cartilagineo anguloso lacunoso-subcanaliculato opaco e viridi fuscescente, ramis irregulariter subdichotome ramosis patentibus, fertilibus superne incrassatis; apotheciis terminalibus appendiculatis margine dentato-fimbriatis demum convexis nigris.—On the bark of trees, Monterey, California, *Menzies*. Fronds in small, roundish masses, many branches diverging from a single base, with the aspect rather of a small, slender state of *Ramalina calicaris*, β , than of the erect *Cetrariæ*, to which, and in particular *C. tristis* and *C. aculeata*, it is indeed, if I mistake not, nearest allied. The station, upon trees, and on the coast of California, is a very unlikely one for *C. aculeata*, from which the present also differs remarkably in habit of growth, and in color. Though more than seventy years have passed since the venerable botanist who gave me these specimens collected them, they appear to be undescribed.

STICTA RAVENELII, sp. nova, thallo pusillo suborbiculari membranaceo appresso scrobiculato viridi-glaucoscente (fuscescente) laciniis elongatis sinuato-lobatis crenatis (glomerulis fruticulosus viridibus nunc aspersis) subtus fuscescentibus tomentosus; apotheciis sparsis margine inflexo persistente crenulato-sublobato. Sporæ elongato-fusiformes 1-3-septatæ virescentes diam. 12-20-plo longiores.—Trees, in the low country of South Carolina, *Mr. Ravenel*; Alabama, on trees, *Mr. Peters*; and also on rocks (the specimen dark brown), *Mr. Beaumont*; Mississippi, *Dr. Veitch*; Louisiana, *Dr. Hale*; (Cuba, *Mr. Wright*).—A smaller plant than either of the two species of this group, of the northern hemisphere, with much the lobation of *S. glomerulifera*, but the texture of *S. herbacea*, and distinguished, so far as my specimens go, from both, by its strongly pitted upper surface, and its crenulate-lobate apothecia, which rather approach those of some of the tropical members of the group, as *S. pallida*, Hook. The glomerules appear only on a Cuban specimen. They are quite like those of *S. glomerulifera*, but the largest do not exceed a line in diameter. The spores are more elongated than those of the species just mentioned, and appear to be differently septate.

[*STICTA WRIGHTII*, sp. nova, thallo subcoriaceo adpresso lævigato viridi-glaucescente, laciniis rotundatis sinuato-incisis crenatis subtus fuscis ambitu pallescentibus tomentosis, cyphellis plano-concavis albis; apotheciis sparsis elevatis extus mammillatis e concavo margine inflexo demum planis margine irregulari subevanescente. Sporæ late fusiformes uniseptatæ limbatae virescentes diam. c. 5-plo longiores.—On beech trunks, mountain sides, Hakodadi, Japan, *Mr. Wright*. With the apothecia, and the general aspect of *S. glomerulifera*, but differing in a rather more loose habit of lobation, it which it approaches nearer to the broader forms of *S. damæcornis*; in its spores; and most remarkably, in possessing in abundance, regular cyphellæ; which resemble those of *S. fuliginosa*, though also occurring urceolate, as in *S. damæcornis*. The genus *Ricasolia*, De Not., was originally constituted, to include the natural group of species to which the present belongs, on a mistaken comparison of the apothecia of these species, with certain abnormal apothecia common in other species of *Sticta*, which are now regarded, since the publication of Mr. Tulasne's important researches, as morbid conditions, infested by a parasitic cryptogam. (Tulasne, *Mém. sur les Lichens*, p. 123, note.) The species included in the group, agreeing as they do in many obvious features, were also once supposed to be destitute of cyphellæ, and the greater part, and in particular, the tropical ones, probably are so; but Fries and Delise testify to the occurrence of this development, however rarely, in both the old species of the northern hemisphere, while in the Japanese lichen, above-described, it is normal. This species may not improbably be found to occur also in North America.]

[*PHYSICIA?* *WRIGHTII*, sp. nova, thallo orbiculari imbricato tenui molliusculo polito pallide viridi (glaucescente) subtus albo venis minusculis prominulis villosis reticulato, hypothallo nunc crassiusculo byssaceo-lanuginoso cinerascete, laciniis planis irregulariter multifido-lacinulatis, ambitu latioribus palmatis, centro plus minus excrescentiis isidiomorphis cylindricis obsitis; apotheciis subcentralibus sessilibus disco plano luteolo margine crasso incurvo crenulato cincto demum flexuosis. Sporæ—On trunks of trees in dense woods, in the mountains of Cuba, *Mr. Wright*. With the habit of *Physcia*, but also a good deal resembling *Parmelia ambigua*. The species appears to be undescribed.]

LECANORA ASCOCISCANA, Tuck. herb. *Psoroma*, Tuckerm. suppl. &c. in *Amer. Journ. Sci.*, xxv, p. 424. There is something in this curious lichen which suggests a near affinity to *Psoroma*, as the genus is constituted by Dr. Nylander, but the fusciscent, often a little curved and kidney-shaped, one-septate

spores indicate its true place in *Lecanora*, where it long stood in my herbarium. The spores resemble those (I owe the suggestion to Dr. Nylander) of *L. sophodes*, but the lichen is very distinct.

[*LECANORA CAMPALEA*, sp. nova, thallo crustaceo tartareo verrucoso-subplicato lævigato viridi-glaucescente (pallescente) hypothallo nigro insigni limitato; apotheciis appressis demum flexuoso-irregularibus disco tumente e rufo fusco-nigrescente margine thallode integro pallente. Sporæ suboctonæ elongato-fusiformes 5-pluriseptatæ diam. 10–15 plo longiores hyalinæ.—Trees, Island of Cuba, *Mr. Wright*. The affinity of this elegant lichen to *L. ventosa* is indicated, no less by the spores than by the external characters.]

[*BIATORA RHODOPIS*, sp. nova, thallo crustaceo effuso tenui cartilagineo-membranaceo lævigato rimuloso limitato glauco-cinerascente, intus miniato; apotheciis sessilibus hinc inde aggregatis demum difformibus margine tumidulo integerrimo lævi mox flexuoso saturate roseo discum subplanum nudum rufo-nigrescentem hypothecio crassiusculo nigro impositum cingente. Sporæ suboctonæ ellipsoideæ simplices diam. duplo longiores hyalinæ.—On bushes in the Island of Cuba, *Mr. Wright*. Differs remarkably from described species, but has somewhat of the general aspect of *L. domingensis*.

BIATORA VIRELLA, sp. nova, thallo crustaceo effuso incrustante subtartareo rugoso-granulato glauco-sulphureo, humecto viridi; apotheciis sessilibus margine tenui pallidiori integerrimo mox flexuoso evanido discum planoconvexum rufo-fuscescentem cingente. Sporæ minuscule ellipsoideæ subfusiformes diam. triplo longiores hyalinæ.—On rocks in dense woods, in the mountains of Cuba, *Mr. Wright*. With the habit of *L. glebulosa*.

BIATORA PYRRHOMELÆNA, sp. nova, thallo e granulis minutis rotundatis mox subsquamaceis imbricatis glaucescentibus intus miniatis hypothallum crassum rufo-nigricantem ad ambitum prominentem interrupte obtegentibus; apotheciis ex hypothallo oriündis subplanis margine tenuissimo erecto flexuoso rufo-nigrescente discum nigrum nitidum hypothecio rufo impositum cingente, dein conglomeratis convexis marginem excludentibus. Sporæ minutæ ellipsoideæ simplices hyalinæ.—On trunks of trees near the ground, in the mountains of Cuba, *Mr. Wright*. Near to *B. parvifolia*, but differing as described.

BIATORA PHÆASPIS, sp. nova, thallo crustaceo effuso e granulis subsquamaceis mox corallinis pallide ochroleucis; apotheciis appressis rufo-fuscis flexuosis disco demum convexo marginem obtusum pallidiorem excludente. Sporæ fusiformi-cylindricæ 1–4-septatæ diam. 3–4-plo longiores hyalinæ.—Trees, Cuba, *Mr. Wright*. Also resembling *B. parvifolia* in general appearance,

but the spores connect the lichen rather with *B. vernalis*. It does not appear to be described.]

GYROSTOMUM CURTISII, Tuckerm. suppl. in Amer. Journ. Sci., xxv, p. 430, a determination made upon high authority, is referred by my friend Mr. Russell to *Lecidea*; and the spores, as his sketch fully shows, indicate that the lichen is probably only a small form of *L. disciformis* (*L. parasema*, Fr. *a*) in which the apothecia are a little urceolate. *G. urceolatum* is also referred to *Lecidea* by Dr. Nylander (*Enum. Gen.*, p. 127) but seems to me to be remarkably distinguished by the structure of the apothecium, and the vermicular spores.

ART. XXII.—*On the Phenomena of Gemmation.*—Lecture before the meeting of the Royal Institution of Great Britain, by THOMAS H. HUXLEY, F.R.S.*

THE speaker commenced by stating that a learned French naturalist, M. Duvau, proposed many years ago, to term the middle of the eighteenth century, "l'Époque des Pucerons:" and that the importance of the phenomena which first brought to light by the study of these remarkable insects renders the phrase "Epoch of Plant-lice," as applied to this period, far less whimsically inappropriate than it might at first sight seem to be.

After a brief sketch of the mode of life of these Plant-lice, or *Aphides*, as they are technically termed; of the structure of their singular piercing and sucking mouths; and of their relations to what are called "Blights;" the circumstances which have more particularly drawn the attention of naturalists to these insects were fully detailed.

It was between the years 1740 and 1750, in fact, that Bonnet, acting upon the suggestions of the illustrious Reaumur, isolated an *Aphis* immediately after its birth, and proved to demonstration, that not only was it capable of spontaneously bringing forth numerous living young, but that these and their descendants, to the ninth generation, preserved a similar faculty.

Observations so remarkable were not likely to pass unheeded; but notwithstanding the careful sifting which they have received, Bonnet's results have never been questioned. On the contrary, not only have Lyonet, Degeer, Kyber, Duvau, and others, borne ample testimony to their accuracy, but it has been shown that, under favorable conditions of temperature and food, there is practically no limit to this power of a sexual multiplication, or as it has been conveniently termed, "Agamogenesis."

* From the Proceedings of the Royal Institution of Great Britain, May, 1858,